

Appl. No. : 09/909,181  
Filed : July 19, 2001

## AMENDMENTS TO THE CLAIMS

### Claims 1-7 (Canceled)

8. ~~(Currently Amended) The semiconductor structure of Claim 7 wherein the foamed polymeric material comprises polynorbornene~~ A high density semiconductor structure having a plurality of integrated circuit chips, comprising:

a first integrated circuit having an upper bonding surface;

a second integrated circuit chip secured to the first chip in a manner such that a lower bonding surface of the second chip is positioned adjacent to the upper bonding surface of the first chip; and

a chip insulating layer disposed between the first and second chips so as to provide electrical isolation between the chips, wherein the chip insulating layer comprises an insulating material and a plurality of enclosed regions of air dispersed within and throughout the insulation material, wherein the dielectric constant of the chip insulating layer is less than the dielectric constant of the insulating material, wherein the chip insulating layer comprises a foamed polymeric material, said polymeric material is polynorbornene.

9. (Currently Amended) The semiconductor structure of Claim 1 8 wherein each enclosed region of air is less than 1 micron.

10. (Currently Amended) The semiconductor structure of Claim 1 8 wherein each enclosed region of air is approximately 0.1 micron.

11. (Currently Amended) The semiconductor structure of Claim ~~18~~, further comprising a conductor insulating layer formed on the upper bonding surface of the first chip, wherein the conductor insulating layer provides electrical isolation between adjacent conductive leads disposed on the upper bonding surface of the first chip, wherein the conductor insulating layer comprises an insulating material and a second plurality of enclosed regions of air dispersed throughout the insulating material, wherein the dielectric constant of the conductor insulating layer is lower than the dielectric constant of the insulating material, and wherein each of said second enclosed region of air is less than the minimum distance separating adjacent conductive leads.

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12. (Currently Amended) The semiconductor structure of Claim 48 wherein the dielectric constant of the chip insulating layer is approximately one third of the dielectric constant of the insulating material.

13. (Original) The semiconductor structure of Claim 12 wherein the dielectric constant of the insulating material is less than 1.5.

14. (Currently Amended) The semiconductor structure of Claim 41 wherein the conductive leads are made of an aluminum alloy.

15. (Currently Amended) The semiconductor structure of Claim 48 further comprises a third integrated circuit chip wherein the third chip is secured to the second chip in a manner such that a lower surface of the third chip is positioned adjacent an upper surface of the second chip, wherein a third insulating layer is disposed between the second and third chips.

16. (Original) The semiconductor structure of Claim 15 wherein the third insulating layer comprises a foamed polymeric material.

17. (Currently Amended) The ~~multichip-cube~~ semiconductor structure of Claim 16 wherein the first integrated circuit chip further comprises a lower surface wherein a fourth insulating layer is formed on the lower surface of the first chip.

18. (Currently Amended) The ~~multichip-cube~~ semiconductor structure of Claim 17 wherein the fourth insulating layer comprises a foamed polymeric material.

Claims 19-24 (Canceled)

25. (Currently Amended) ~~The multichip-cube structure of Claim 20 wherein the polymeric material is polynorbornene~~ A multichip cube structure having a plurality of integrated circuit chips, comprising:

a first integrated circuit chip having a first insulating layer disposed on an upper surface of the chip so as to electrically isolate a plurality of metal leads disposed on the upper surface thereof, wherein the first insulating layer is comprised of an insulating material having a first dielectric constant, wherein the dielectric constant of at least a portion of the first insulating layer is lower than the first dielectric constant;

a second integrated circuit chip secured to the first chip in a manner such that a lower surface of the second chip is positioned adjacent the upper surface of the first chip; and

a second insulating layer is disposed between the first and second chips wherein the second insulating layer is comprised of a second insulating material having a second dielectric constant, wherein at least a portion of the second insulating layer contains a plurality of enclosed regions of air formed within the second insulating material, wherein the dielectric constant of the second insulating layer is lower than the second dielectric constant, wherein the first insulation material comprising a polymeric material, said polymeric material is polynorbornene.

26. (Original) The multichip cube structure of Claim 25 wherein the insulating material is treated with a hydrogen containing radical so as to make the surface more hydrophilic.

Claims 27-32 (Canceled)

33. (New) The semiconductor structure of Claim 11 wherein the conductor insulating layer comprises a foamed polymeric material.

34. (New) The semiconductor structure of Claim 33 wherein the foamed polymeric material comprises a foamed polyimide.

35. (New) The semiconductor structure of Claim 34 wherein the foamed polyimide is approximately 2.1 microns thick.

36. (New) The semiconductor structure of Claim 33 wherein the foamed polymeric material comprises a hydrophobic material wherein the hydrophobic material is treated so as to provide the material with hydrophilic properties.